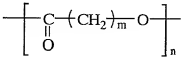
CLAIMS:

1. An ion-conductive composition comprising an electrolyte solution composed of an ion-conductive salt and a solvent in which the ion-conductive salt is soluble, in combination with a thermoplastic resin having a swelling ratio, as determined from the equation

$$\text{swelling ratio (\%)} = \frac{\text{weight in grams of swollen thermoplastic resin after 24 hours immersion in electrolyte solution at 20°C (g)}}{\text{weight in grams of thermoplastic resin before immersion in electrolyte solution at 20°C (g)}} \times 100 ,$$

within a range of 150 to 800%.

2. The ion-conductive composition of claim 1 in which the thermoplastic resin contains units of general formula (1) below



(1)

wherein the letter m is a number from 3 to 5, and the letter n is 5 or more.

3. The ion-conductive composition of claim 1 or 2, wherein the thermoplastic resin contains 1 to 100 % by weight, based on the overall thermoplastic resin, of a thermoplastic polyurethane resin prepared by reacting a polyol compound with a polyisocyanate compound and a chain extender.

4. The ion-conductive composition of claim 3, wherein the polyol compound is a polyester polyol, a polyester polyether polyol, a polyester polycarbonate polyol, a polycaprolactone polyol, or a mixture thereof.

5. A gel electrolyte prepared by shaping the thermoplastic resin according to any one of claims 1 to 4, then immersing the shaped resin in an electrolyte solution to effect swelling.

6. The gel electrolyte of claim 5 which has an ionic conductivity $\sigma 1$ (S/cm), as measured by the AC impedance method at 25°C, and an ionic conductivity $\sigma 2$ (S/cm), similarly measured at -10°C, such that the ratio $\sigma 1/\sigma 2$ is from 1 to 10.

7. A non-aqueous electrolyte battery comprising:
a positive electrode,
a negative electrode,
a separator disposed between the positive and negative electrodes, and
an electrolyte solution;
wherein, of the positive electrode and the negative electrode, either the positive electrode comprises a positive electrode current collector coated with a positive electrode binder composition composed primarily of the thermoplastic resin of any one of claims 1 to 4 and a positive electrode active material, or the negative electrode comprises a negative electrode current collector coated with a negative electrode binder composition composed primarily of the thermoplastic resin of any one of claims 1 to 4 and a negative electrode active material.

8. A non-aqueous electrolyte battery comprising:
a positive electrode,
a negative electrode,
a separator disposed between the positive and negative electrodes, and
an electrolyte solution;
wherein the positive electrode comprises a positive electrode current collector coated with a positive electrode

binder composition composed primarily of the thermoplastic resin of any one of claims 1 to 4 and a positive electrode active material, and the negative electrode comprises a negative electrode current collector coated with a negative electrode binder composition composed primarily of the thermoplastic resin of any one of claims 1 to 4 and a negative electrode active material.

9. A non-aqueous electrolyte battery comprising:

a positive electrode and a negative electrode, each comprised of a current collector coated with a binder composition composed primarily of a thermoplastic resin and an active material,

a separator disposed between the positive and negative electrodes, and

an electrolyte solution;

wherein 1 to 20 % by weight of the thermoplastic resin in the binder composition is a thermoplastic resin according to claim 1 which has a glass transition temperature lower than the freezing point of the electrolyte solution.

10. The non-aqueous electrolyte battery of claim 9, wherein the thermoplastic resin having a glass transition temperature lower than the freezing point of the electrolyte solution is a thermoplastic polyurethane resin prepared by reacting a polyol compound with a polyisocyanate compound and a chain extender.

11. The non-aqueous electrolyte battery of any one of claims 7 to 10, wherein the separator is composed of a separator base impregnated with an electrolyte solution.

12. The non-aqueous electrolyte battery of any one of claims 7 to 10, wherein the separator is composed of the gel electrolyte of claim 5 or 6.

13. An electrical double-layer capacitor comprising:

a pair of polarizable electrodes,

a separator disposed between the polarizable electrodes, and

an electrolyte solution;

wherein one or both of the pair of polarizable electrodes is comprised of a current collector coated with a polarizable electrode binder composition composed primarily of the thermoplastic resin of any one of claims 1 to 4 and activated carbon.

14. An electrical double-layer capacitor comprising:

a pair of polarizable electrodes, each comprised of a current collector coated with a polarizable electrode binder composition composed primarily of a thermoplastic resin and activated carbon,

a separator disposed between the polarizable electrodes, and

an electrolyte solution;

wherein 1 to 20 % by weight of the thermoplastic resin in the binder composition is a thermoplastic resin according to claim 1 which has a glass transition temperature lower than the freezing point of the electrolyte solution.

15. The electrical double-layer capacitor of claim 14, wherein the thermoplastic resin having a glass transition temperature lower than the freezing point of the electrolyte solution is a thermoplastic polyurethane resin prepared by reacting a polyol compound with a polyisocyanate compound and a chain extender.

16. The electrical double-layer capacitor of any one of claims 13 to 15, wherein the separator is composed of a separator base impregnated with an electrolyte solution.

17. The electrical double-layer capacitor of any one of claims 13 to 15, wherein the separator is composed of the gel electrolyte of claim 5 or 6.